

BACCHARIS MONOICA (COMPOSITAE: ASTEREAE), A MONOECIOUS SPECIES
OF THE B. SALICIFOLIA COMPLEX FROM MEXICO AND CENTRAL AMERICA

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ABSTRACT

All plants of the Baccharis salicifolia (Ruiz & Pavon) Pers. complex from Nicaragua to eastern Oaxaca in Mexico are strictly monoecious, each individual bearing both pistillate and staminate heads. This population system is separated as a new species, B. monoica, which is geographically interposed between the dioecious plants of this complex in South America and those to the north in Mexico and the United States. Also noted is the occurrence in Baccharis of other deviations from the typical dioecious condition.

In preparation of a systematic treatment of the Mexican species of Baccharis, a reevaluation of the B. salicifolia (Ruiz & Pavon) Pers. complex has been necessary. A longer paper treating various other taxonomic problems in Mexican Baccharis is forthcoming, but these results are presented here separately because of their particular biological interest and implications.

Cuatrecasas (1968) recognized all the plants of this complex as a single species, B. salicifolia, with three varieties -- ranging in western South America from Argentina to Colombia to Central America and Mexico and northward to California and Texas in the United States. He dismissed the South American varieties established by Heering (1914) as "confusas, de tipificacion difcil y no se pueden identificar." Cuatrecasas himself, however, presented no key and only rather vague distinctions between the taxa that he recognized. He considered all the plants north of South America as var. longifolia (DC.) Cuatr. Both Blake (1926) and Matuda (1957) also treated this complex in Mexico as a single species conspecific with the South American plants, but neither commented on infraspecific variation. Nor have more recent studies, e.g. McVaugh (1984) and Rzedowski (1985), adopted the varietal status proposed by Cuatrecasas for the northern segment of this complex. The types of B. salicifolia and B. glutinosa Pers., the latter a name widely used in the past but a synonym of the former (see Cuatrecasas, 1968) are from Peru and Chile, respectively.

In reviewing the Mexican and Central American material identified as Baccharis salicifolia, I find, in contrast to previous systematists, that a remarkable discontinuity exists among them. The plants from the Isthmus of Tehuantepec in eastern Oaxaca southward to

Nicaragua bear homogamous heads but are strictly monoecious. Each plant bears mostly pistillate heads, but staminate heads are scattered through the capitulescence. I have not been able to discern a predictable pattern in the occurrence of the staminate heads. Counts on specimens from LL and TEX show a ratio of pistillate:staminate heads of (1-) 5-15:1. A specimen from Oaxaca (Maya J. 460) is unusual in having nearly an equal number of pistillate and staminate heads. Rarely a skimpy or fragmentary herbarium specimen may appear to have only pistillate heads, but I believe this is clearly because the collector preserved an inadequate sample. Plants with only staminate heads are not to be found. Among the collections I have examined from MO, LL, and TEX, all plants from this area, with only the caveat noted above, have both types of heads. Northward, from Oaxaca through Mexico to California and Texas in the United States, the plants are uniformly dioecious (see below). All the South American plants I have seen are either pistillate or staminate, indicating that the plants there are dioecious, also.

Before I saw that they were radically different, I had annotated many specimens from Central America and southern Mexico as *Baccharis salicifolia*. After realizing, however, that they are monoecious, this feature of the plants is simple to observe. They also proved to be morphologically differentiated in several other characteristics, although, as noted below, there is some overlap and the only way to distinguish them with absolute certainty is by ascertaining the sexual condition. I recognize the monoecious plants of this widespread and geographically discrete population system as a distinct species, the first such taxon to be admitted to a genus heretofore composed only of dioecious species.

Baccharis monoica Nesom, sp. nov.

B. salicifoliae (Ruiz & Pavon) Pers. arcte affinis a qua imprimis differt plantis monoeciis, capitula homogamae aut pistillatae aut staminatae, planta omnis ferens capitula pistillata et staminata.

Glabrous shrubs or small trees 1-5 m tall, reported by some collectors to have an agreeable fragrance. Leaves lanceolate to elliptic-lanceolate, 3-nerved, 5.5-12.5 cm long, 5-15 mm wide, (7-) 14-23 times longer than wide, the margins nearly entire to prominently serrate mostly with 2-4 teeth per cm. Heads in corymbose panicles; phyllaries ovate-lanceolate, stramineous with a brown midline or central area at the apex, usually with sharply delimited, scarious margins, ciliolate at the apex; pistillate and staminate heads 4.5-6.0 mm high, 3-5 mm wide. Pistillate corollas tubular-filiform, 2.5-3.0 mm long, the styles 3.8-4.0 mm long with branches 0.3-0.4 mm long. Staminate flowers completely without ovaries, the corollas 4.0-4.5 mm long, the tube 2.2-3.0 mm long, the lobes cut almost all the way to the top of the tube. Achenes 0.9-1.1 mm long, terete to slightly flattened, glabrous, with 4-7 delicate nerves; pappus a single series of 24-27 bristles 3-4 mm long.

Eastern Oaxaca (the Isthmus of Tehuantepec) through Chiapas in México, to Guatemala, El Salvador, Honduras, and Nicaragua; dry to moist habitats, shrubby slopes, tropical deciduous forests, seasonal evergreen with oak, or pine-oak with liquidambar or arbutus; 30-1400 (-2400) m; Jul-Feb.

TYPE: MEXICO, Chiapas, Mpio. Bochil, 7 km NE of Bochil along road to Simojovel, 10 Oct 1972, D. E. Breedlove 28727 (Holotype: LL).

Representative specimens examined: MEXICO: Oaxaca, Mpio. Sn. Miguel Chimalapa, Río Escondido (Arroyo Baul) 0.8 km W of its union with Río Portamonedas, ca. 38 km in a straight line N of San Pedro Tapanatepec, 17 Aug 1984, Maya J. 460 (TEX). Chiapas, between Mazapa and Motozintla, 19 Jul 1941, Matuda 4875 (LL). GUATEMALA, Dept. Huehuetenango, beside stream, 3 Sep 1934, Skutch 1107 (LL). HONDURAS, Dept. Morazán, bank of Yeguaré River, Zamorano Valley, 10 Sep 1946, Williams and Molina R. 10514 (LL). NICARAGUA, Dept. Esteli, along road from Condega to Yali, ca. 16.9 km NE of Hwy 1 and ca. 3.5 km SE of Valle Santa Rosa, 19 Nov 1979, Stevens 15819 (TEX).

Baccharis monoica is geographically interposed between the South American representatives of the B. salicifolia complex and those to the north. Further, a significant distributional hiatus exists from the southern end of the range of B. monoica in Nicaragua to Colombia, where B. salicifolia occurs but is rare. The South American plants appear to be highly variable, with significant differences among them in leaf shape and size as well as corolla and achene morphology. In Argentina, Cabrera (1978) found the species to be variable in viscosity, leaf shape and margin, and head size; he did not distinguish varieties in the region of this flora. In my opinion, the varietal categories offered by Cuatrecasas are too vague to be of value in dealing with the complex variation found in South America.

Plants of the dioecious population system to the north of B. monoica are common in Oaxaca but apparently are allopatric with the latter in distribution, although the two evidently approach each other closely. I have seen one collection of the dioecious species from the Isthmus of Tehuantepec in Oaxaca (4 km N of Matias Romero, King 722-LL), slightly to the west of the monoecious collection cited below. The two taxa usually can be distinguished by leaf shape and head size in addition to their differences in sexual constitution (see the key below). Until a more detailed study is rendered of the complex over its entire geographic range, particularly in South America, I regard the dioecious North American element as conspecific with the South American. Although the former is more uniform in morphology and, because of its geography, reproductively isolated, it appears to be largely within the limits of variability of the latter.

Key to the taxa of the *Baccharis salicifolia* complex
north of South America

1. Monoecious, individual plants with both pistillate and staminate heads; leaves (7-) 14-23 times longer than wide; heads 4.5-6 mm high; achenes 0.9-1.1 mm long *B. monoica*
1. Dioecious, individual plants with either pistillate or staminate heads; leaves 6-14 (-16) [-20] times longer than wide; heads 2.5-4.5 (-5) mm high; achenes 1-1.5 mm long *B. salicifolia*

Although the leaf shape usually distinguishes these two taxa, particularly in Oaxaca where they approach one other geographically, enclaves of more narrow-leaved forms (up to 20 times longer than wide) of *B. salicifolia* exist in western Jalisco to Nayarit and in central Chihuahua. In these areas, however, the heads are still smaller than is typical for *B. monoica*.

Although this is the first monoecious species to be included in a genus of about 400 dioecious ones, it does not seem so unexpected from one perspective. I believe that *B. monoica* has been derived through the stabilization and spread of a sexually deviant population of the dioecious *B. salicifolia* complex. Sexual abnormalities in *Baccharis* have been known and commented on in the past, although this is the first example I am aware of in *Baccharis* where individual plants produce both homogamous pistillate and staminate heads. McVaugh (1984) observed a plant of *B. salicifolia* from Nueva Galicia that had produced hermaphroditic but sterile flowers in an otherwise pistillate head. He also said that he had observed the same phenomenon in plants of *B. salicifolia* (= *B. monoica*) from "Chiapas to Costa Rica," but I have not been able to confirm this. I have seen, however, plants of *B. monoica* (Williams and Molina 10514-LL) and *B. myrsinites* (Lam.) Pers. (Mejia 540-TEX) that produced a few outer pistillate flowers in the staminate heads. I have observed pistillate heads with inner staminate flowers in *B. cotinifolia* (Willd.) Urb. (Proctor 26002-LL) as well as in a remarkable collection of *B. multiflora* H.B.K. (Rzedowski 25375-WIS). Such populations are technically polygamo-dioecious and (technically) might be placed in the genus *Archibaccharis* Heering.

Archibaccharis is separated from *Baccharis* primarily on the basis of the peculiar sexual constitution of its pistillate heads. Otherwise, there is seemingly no single characteristic that can be used to consistently distinguish one genus from the other. Jackson (1975) treated the taxonomy of *Archibaccharis* in detail, and I have presented refinements of Jackson's study and additional taxa (Nesom, 1988a, 1988b). A discussion of the relationship of *Archibaccharis* to *Baccharis* is in preparation.

The relationship of the genus *Baccharidastrum* Cabrera, including two monoecious species with heterogamous heads, to *Baccharis* is discussed in a paper presented concurrently with this one (Nesom, 1988c). The monotypic *Baccharidiopsis*, another genus of the

Baccharidinae (Barroso, 1975), is said to have three types of plants, each individual with either pistillate, staminate, or hermaphroditic flowers, but I have not yet been able to study specimens of this.

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